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Exam. Code: 0937

Sub. Code: 6992

1128

Bachelor of Engineering (Electrical and Electronics Engineering)

7th Semester

EE – 711: Electrical Insulation in Power Apparatus and Systems

Time allowed: 3 Hours

Max. Marks: 50

Note: Attempt any five questions, including Question No. 1 which is compulsory and selecting at least two questions from each Unit.

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I. Attempt the following questions:-

- a) What do you mean by insulation coordination and its statistical approach?
- b) What do you mean by the terms treeing and tracking?
- c) Discuss the factors affecting spark over voltage of sphere gaps.
- d) Discuss the importance of grounding in High Voltage Testing Lab.
- e) Explain the breakdown involved in commercial liquid dielectrics. (5×2)

UNIT – I

II. Explain thermal breakdown in solid dielectrics. Give comparison between uniform and non-uniform fields. Define Townsend's second ionization coefficient and Townsend's self-sustained discharge. (10)

- III. a) Derive the expression of power-loss in an insulating material when it is subjected to an electrical stress.
b) Explain with a neat diagram, the method to measure the specific resistivity of an insulation specimen, along with dielectric constant and loss factor. (5,5)

- IV. a) Explain stressed oil volume theory for breakdown of liquids.
b) Derive the criterion for breakdown in electronegative gases. (5,5)

UNIT – II

V. Describe the construction and principle of operation of electrostatic voltmeter. Discuss its advantages for high voltage measurement. Also explain the procedure for measurement of impulse using sphere gap. (10)

VI. A Schering bridge was used to measure the capacitance and loss angle of H.V. Bushing. At balance, the observations were, the value of standard condenser = 100 pF , $R_3 = 3180 \Omega$, $e_3 = 0.00125 \mu\text{F}$ and $R_4 = 636 \Omega$. What are the values of $\tan \delta$ of the bushing and capacitance? (10)

VII. Write short note on the following:-

- i) Overview of nanodielectrics.
- ii) Insulation defects in power system. (5,5)

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